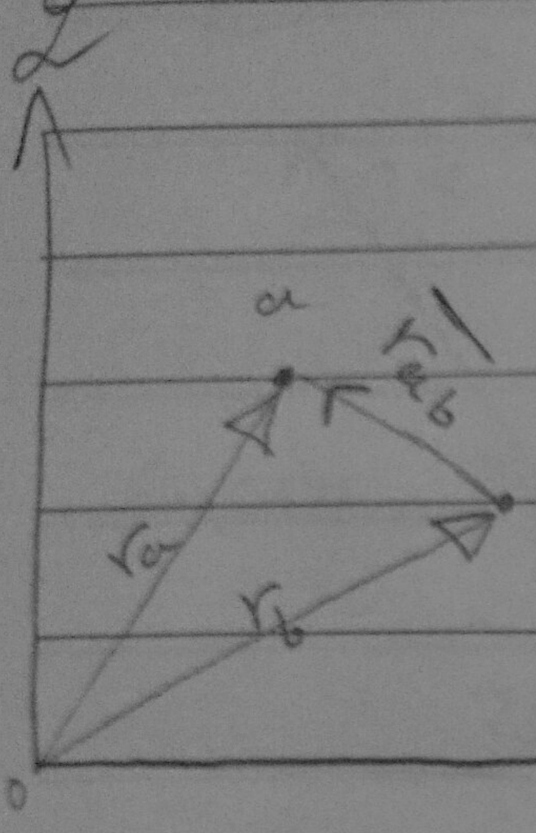
Date: (4.04) Subject:

الباب الثاني

السرعة النسبية

متجه الموضع النسبي ($\overline{r_{ab}}$)



$$\bar{r}_a = \bar{r}_b + \bar{r}_{ab}$$

$$\{\bar{r}_{ab} = \bar{r}_a - \bar{r}_b\}$$

بالمثل $\{\bar{r}_{ba} = \bar{r}_b - \bar{r}_a\}$

$$\{\bar{r}_{ab} = -\bar{r}_{ba}\}$$

- السرعة النسبية :-

$$\bar{V}_{ab} = \frac{d\bar{r}_{ab}}{dt} = \frac{d}{dt}(\bar{r}_a - \bar{r}_b)$$

$$\{\bar{V}_{ab} = \bar{V}_a - \bar{V}_b\}$$

$$\{\bar{V}_{ba} = \bar{V}_b - \bar{V}_a\}$$

$$\{\bar{V}_{ab} = -\bar{V}_{ba}\}$$

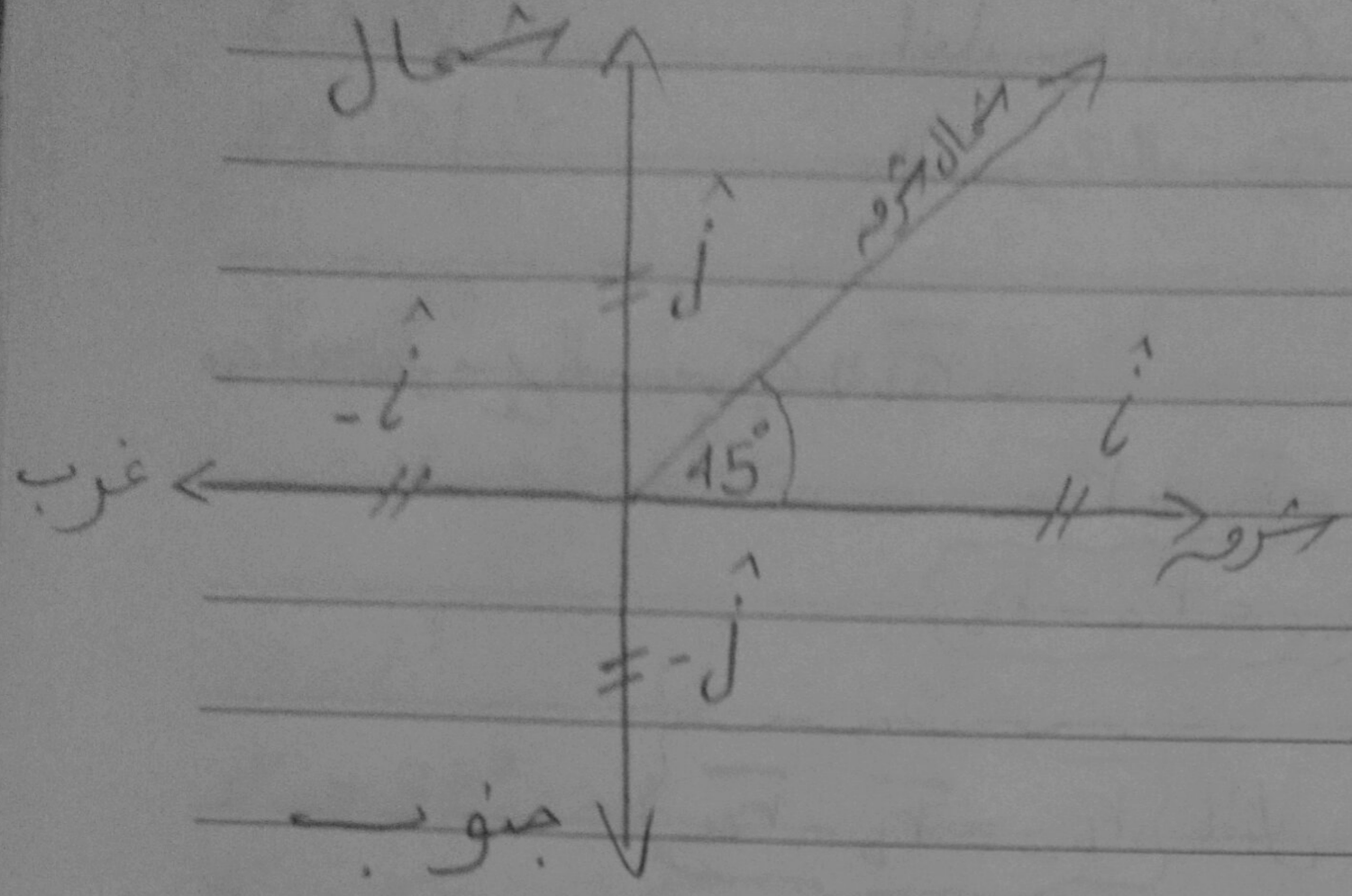
العجلة النسبية :

$$\bar{f}_{ab} = \frac{d\bar{V}_{ab}}{dt} = \frac{d}{dt}(\bar{V}_a - \bar{V}_b)$$

$$\{\bar{f}_{ab} = f_a - f_b\}$$

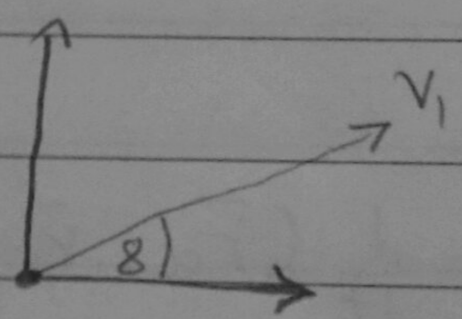
بالمثل $\{\bar{f}_{ab} = -\bar{f}_{ba}\}$

Date: Subject:



EX @

Pg (33)



طائرة $\rightarrow V_1 = 325$ mil/h

الهواء $\rightarrow V_2 = ??$

$V_{12} = 350$ mil/h شرق

الحل

$\overline{V}_{12} = \overline{V}_1 - \overline{V}_2$

$350\hat{i} = (325\cos 8\,\hat{i} + 325\sin 8\,\hat{j}) - V_2$

$V_2 = V_1 - V_{12}$

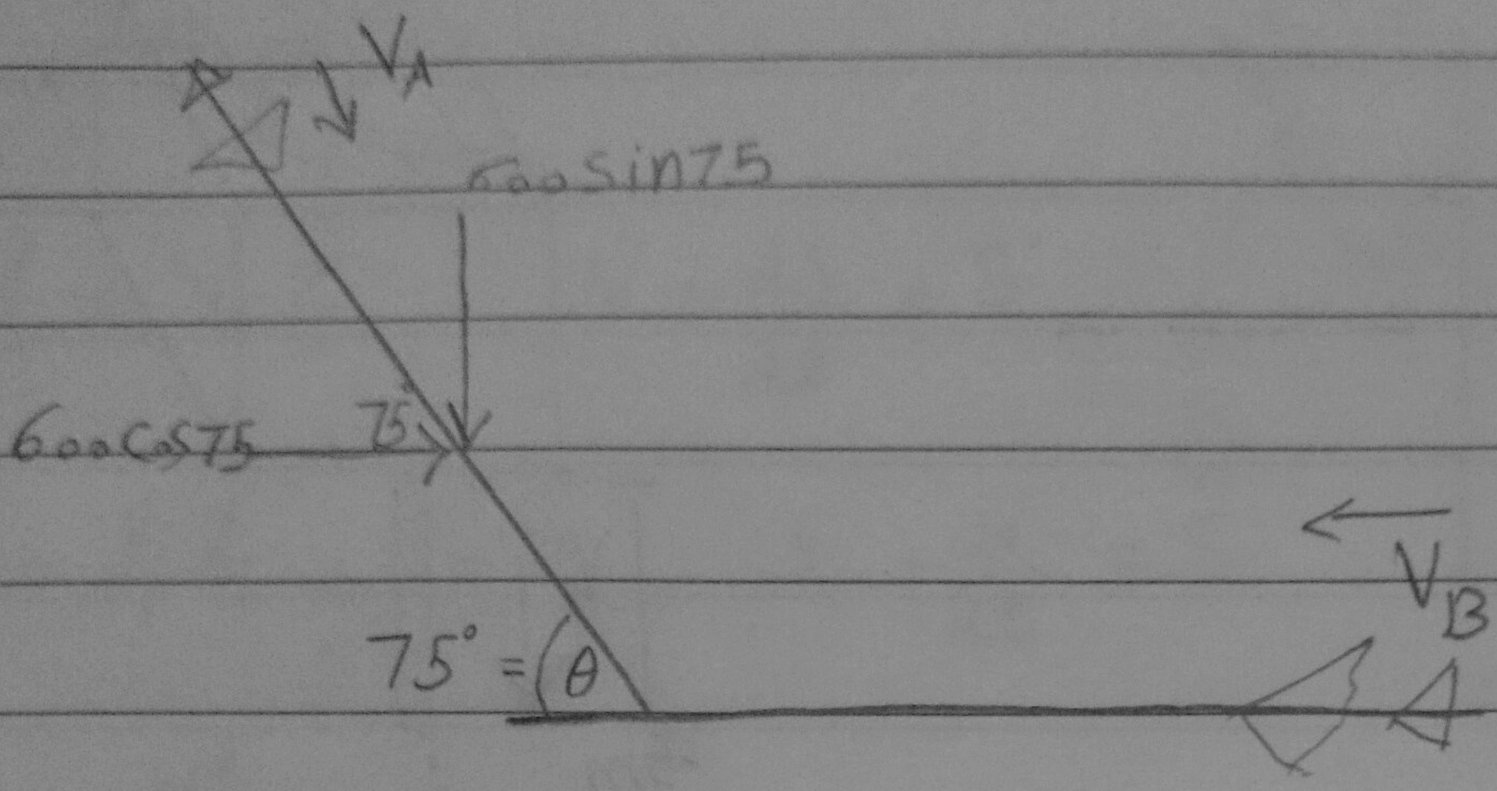
$= (325\cos 8 - 350)\hat{i} + (325\sin 8)\hat{J}$

$V_2 = \sqrt{V_x^2 + V_y^2}$ $\qquad \theta = \tan^{-1}\frac{V_y}{V_x}$

Date: Subject:

Ex (3)

Pg (35)



$V_A = 600$ km/h $V_B = 500$ km/h

$V_{AB} = ??$

$\overline{V_B} = -500\,i$

$\overline{V_A} = 600\cos 75\,\hat{i} - 600\sin 75\,\hat{j}$

$\overline{V_{BA}} = \overline{V_B} - \overline{V_A}$

$= -500\,i - (600\cos 75\,\hat{i} - 600\sin 75\,\hat{j})$

$= (-500 - 600\cos 75)\,\hat{i} + 600\sin 75\,\hat{j}$

$V_{BA} = \sqrt{V_x^2 + V_y^2} = \checkmark$

$\tan\beta = \checkmark$

Date: Subject:

EX (5)

Pg (39)

$\overline{V_{SB}} = ??$

$V_B = 2$ m/s

$V_S =$

$V_0 = 0$

$y = .5$ m

$V^2 = V_0^2 + 2gx$

$= 0 + 2(9.8)(.5)$

$V^2 = 9.8$

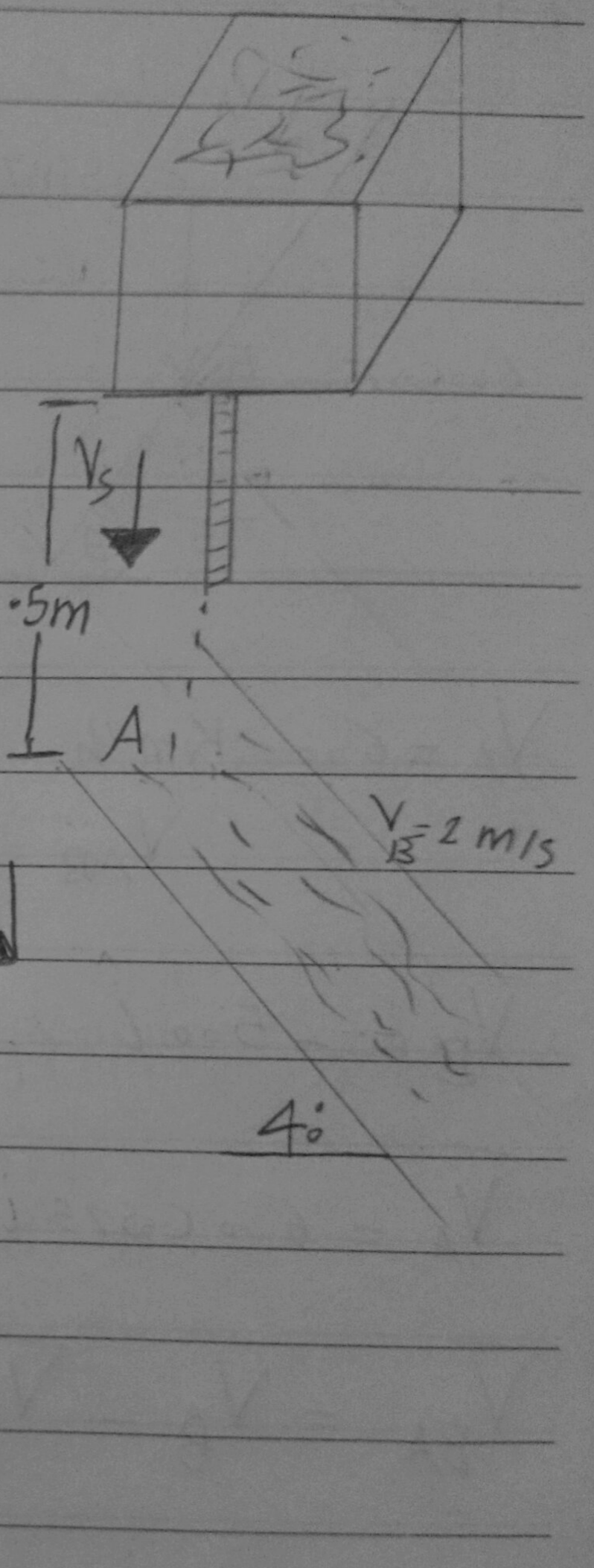
$V_S = 3.13 \downarrow$

$\overline{V_{SB}} = \overline{V_S} - \overline{V_B}$

$\overline{V_S} = -3.13\hat{j}$

$\overline{V_B} = 2\cos 40^\circ \hat{i} - 2\sin 40^\circ \hat{j}$

$\overline{V_{SB}} = 2\cos 40^\circ \hat{i} + (-3.13 - 2\sin 40^\circ)\hat{j}$



Sheet 1 (4) تمرين V.I.P